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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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EXAMINER	
ALEJANDRO, RAYMOND	

ART UNIT	PAPER NUMBER
1745	

DATE MAILED: 05/23/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/005,000	LEE ET AL.	
	Examiner	Art Unit	
	Raymond Alejandro	1745	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *15 April 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1,2,7,8,10 and 11* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *7,8 and 11* is/are allowed.

6)☒ Claim(s) *1,2 and 10* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *07 December 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Continued Examination Under 37 CFR 1.114

1. A request for continued examination under 37 CFR 1.114 was filed in this application after appeal to the Board of Patent Appeals and Interferences, but prior to a decision on the appeal. Since this application is eligible for continued examination under 37 CFR 1.114 and the fee set forth in 37 CFR 1.17(e) has been timely paid, the appeal has been withdrawn pursuant to 37 CFR 1.114 and prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on 04/15/05 has been entered.

This action is being provided in reply to the amendment accompanying the foregoing RCE. Claims 1-2 and 10 are rejected in view of art as presented hereinbelow and for the reasons of record.

Specification

2. The amendment filed 04/15/05 is objected to under 35 U.S.C. 132 because it introduces new matter into the disclosure. 35 U.S.C. 132 states that no amendment shall introduce new matter into the disclosure of the invention. The added material which is not supported by the original disclosure is as follows: a) (claims 1 and 7) "*wherein the working fluid comprises molecules having a carbon-to-carbon bond*"; b) (claim 1) "*wherein the first flow path does not include a steam reforming reactor to reform the working fluid*". Although applicant has pointed out where the amended claim appears to be supported, it is noted that such amendments or limitations lack adequate written description in the application as filed. That is to say, the newly claimed subject matter is unsupported by the original disclosure. With respect to the "*carbon-to-carbon*" limitation, although applicant has made reference to page 7, lines 9-11 of the present

specification as providing support therefor, it is noted that such specific citation simply describes that "*many organic cooling fluids meet both of these requirements. For example, a suitable cooling fluid is R114 ($CClF_2CClF_2$)*". However, it does not specifically recite the limitation "carbon-to-carbon". Concerning the negative limitation "*does not include a steam reforming reactor*", any negative limitation or exclusionary proviso **must** have basis in the original disclosure. Thus, such a negative limitation fails to comply with the written description requirement (See ***MPEP 2163 [R-2] Guidelines for the Examination of Patent Applications Under the 35 U.S.C. 112, para. 1, "Written Description" Requirement and MPEP 2173.05(i) Negative Limitations***). Applicant is required to cancel the new matter in the reply to this Office Action.

Claim Rejections - 35 USC § 112

3. The following is a quotation of the first paragraph of 35 U.S.C. 112:

> The specification shall contain a written description of the invention, and of the manner and process of making and using it, in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same and shall set forth the best mode contemplated by the inventor of carrying out his invention.

4. Claims 1-2 and 10 are rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventor(s), at the time the application was filed, had possession of the claimed invention. The added material which is not supported by the original disclosure is as follows: a) (claims 1 and 7) "*wherein the working fluid comprises molecules <u>having a carbon-to-carbon bond</u>*"; b) (claim 1) "*wherein the first flow path <u>does not include a steam reforming reactor to</u>*

reform the working fluid". Although applicant has pointed out where the amended claim appears to be supported, it is noted that such amendments or limitations lack adequate written description in the application as filed. That is to say, the newly claimed subject matter is unsupported by the original disclosure. With respect to the "*carbon-to-carbon*" limitation, although applicant has made reference to page 7, lines 9-11 of the present specification as providing support therefor, it is noted that such specific citation simply describes that "*many organic cooling fluids meet both of these requirements. For example, a suitable cooling fluid is R114 ($CClF_2CClF_2$)*". However, it does not specifically recite the limitation "carbon-to-carbon". Concerning the negative limitation "*does not include a steam reforming reactor*", any negative limitation or exclusionary proviso **must** have basis in the original disclosure. Thus, such a negative limitation fails to comply with the written description requirement (See ***MPEP 2163 [R-2] Guidelines for the Examination of Patent Applications Under the 35 U.S.C. 112, para. 1, "Written Description" Requirement and MPEP 2173.05(i) Negative Limitations***). Applicant is required to cancel the new matter in the reply to this Office action.

5. Claims 1 and 7 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for a specific organic working fluid having a C-C bond [*i.e. the fluid R114 ($CClF_2CClF_2$)*], does not reasonably provide enablement for the large (infinite) number of organic fluids or compounds also having a C-C bond. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make or use the invention commensurate in scope with these claims. For instance, although the specification at page 7 (lines 9-11) recites "*many organic cooling fluids meet both of these requirements. For example, a suitable cooling fluid is R114 ($CClF_2CClF_2$)*", it does not

specifically encompass each and every organic fluid having a "carbon-to-carbon" bond. Thus, the specification as filed does not reasonably enable one of ordinary skill to fully use all known (countless number) organic compounds (*i.e. fluids*) having a C-C bond as instantly claimed.

6. The following is a quotation of the second paragraph of 35 U.S.C. 112:

> The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

7. Claims 1-2 and 10 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

8. Claim 1 is indefinite because the negative limitation "*wherein the first flow path does not include a steam reforming reactor to reform the working fluid*" is an attempt to claim the invention by excluding what the inventors did not invent rather than distinctly and particularly pointing out what they did invent. That is, the claims tend to define the invention in terms of what it is not, rather than pointing out the invention. *In re Schechter, 205 F.2d 185, 98 USPQ 144* (***Refer to MPEP 2173.05(i) Negative Limitations***).

Claim Rejections - 35 USC § 103

9. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

10. This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

11. Claim 1 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bloomfield 3982962 in view of Myerhoff 4431714.

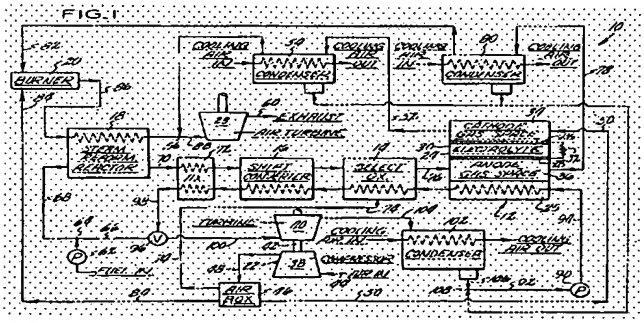
This application is drawn to processes wherein the inventive concept comprises the specific steps of pumping, heating, expanding, compressing, and energy removal. Other limitations include the using shaft work to drive a pump.

As for claim 1:

Bloomfield discloses a fuel cell power plant (TITLE) comprising as shown in **Figure 1** below a pump 90 delivering water via a conduit 92 into thermal exchange relationship with stack 12 via a conduit 94 by passing the water through the thermal exchange portion 25 of the stack (COL 5, lines 28-32). It is disclosed the fuel cells comprises a single cell 24 and a thermal management portion 25 (COL 3, lines 23-27). Bloomfield discloses that the liquid is increased in pressure by pumps (COL 4, lines 1-5). Bloomfield further discloses that part of the water is changed to steam as it passes through the stack 12. The water and steam is superheated by passing it into heat exchange relationship with the fuel conditioning apparatus. It is further heated in the selective oxidizer 14 and the shift converter 16 and in the heat exchanger 72 (COL

5, lines 32-40). The steam then leaves the heat exchanger 72 and is delivered to a valve 96. Then, the remainder of the superheated stream is delivered into turbine 40 (*the expander*) via a conduit 100. The turbine drives the compressor 38 for compressing the air for the stack. The turbine is a steam driven turbine, however, any steam driven engine operably connected to run a compressor may be used (COL 5, lines 40-50).

Bloomfield further teaches that the exhaust from the turbine 40 is delivered into a condenser 102 via a conduit 104. Heat is removed from the steam by passing air through the condenser as shown. Liquid water, or possibly a mixture of liquid water and steams, leaves the condenser 102 via a conduit 106 and is combined at 108 with water recovered from the anode and cathode effluent gas streams in the condensers 54, 80. The water is then delivered to the pump 90 via the conduit 92 and the process starts again (COL 5, lines 50-62). It is disclosed that the amount of water lost in the Rankine cycle loop is recovered in the condensers 54, 80 and which is combined at 108 with the water which recirculates through the loop (COL 6, lines 1-6).



Hence, Bloomfield teaches the specific pump, heat generating fuel cell system, expander, the compressor (the second fuel cell system component) and the condenser satisfying the specific spatial relationship and functional configuration as instantly claimed.

Bloomfield discloses alternate embodiments wherein the working fluid is not necessarily water (COL 6, lines 10-17). Bloomfield further discloses that the working fluid which is pumped

around the system may be, for example, trichlorofluroethane, commonly known as Refrigerant 113, but any fluid having suitable vapor pressure and temperature characteristics may be employed (COL 6, lines 37-45). *It is noted that Refrigerant No. 113 is a chlorofluorocarbon.*

> Referring now to the Rankine cycle portion of the power plant shown in FIG. 2, the working fluid is pumped around the system by a pump 216. The working fluid may be, for example, trichlorotrifluoroethane, commonly known as Refrigerant No. 113, but any fluid having suitable vapor pressure and temperature characteristics may be employed. The fluid passes into the

In addition, the Examiner notes the following: with respect to the organic liquid, Bloomfield clearly specifies that water recovered from the anode effluent gas streams in the condensers 54 or 80 is combined at mixing point 108 with the cooling fluid of the fuel cell power plant (COL 5, lines 50-62). Bloomfield also teaches that the anode gas stream effluent contains enough unburned gas (*emphasis added*) such that there is no need for the burner 20 to have a separated fuel supply (COL 4, lines 63-67). It is disclosed that on the anode side, a hydrogen containing liquid fluid such as naphtha is used as the reactant material. In addition, fuels such as methane may be used (COL 4, lines 1-15). *It is noted that naphtha and methane are organic fluids.* It is further disclosed that although the hydrogen containing liquid fuel such as naphtha is processed in the steam reforming reactor 18 (COL 4, lines 1-5), partial processed fuel leaves the reactor 18 (*emphasis added*), entering the shift converter 16 to only reduce the carbon monoxide of the gas stream (COL 4, lines 16-27), from the shift converter 16 the gases pass into the selective oxidizer 14 to even further reduce the carbon monoxide content of gases (COL 4, lines 28-36). Bloomfield also teaches that a shift converter or selective oxidizer is not required (*emphasis added*), wherein the requirement of the fuel conditioning apparatus are dependent in

part upon the type of unprocessed fuel being used (*emphasis added*) and upon the particular design of the cells (COL 4, lines 40-50). *Having shown that: a) only partially processed fuel such as naphtha leaves the steam reforming reactor 18; b) no further fuel conditioning such as the shift converter and the selective oxidizer is required; c) unburned gas remains in the anode gas stream effluent, and d) the liquid water or a mixture of liquid water and steam leaving the condenser 102 via a conduit 106 is combined at 108 (emphasis added) with stream recovered from the anode effluent gas streams, it is stated that some of the unprocessed and unburned naphtha reactant being fed into the reforming unit and the fuel cell will remain in the anode effluent gas stream and thus will be mixed at the mixing point 108 with the cooling water recirculating through the fuel cell cooling system. Accordingly, cooling fluid would includes both water and residual organic liquid naphtha as cooling liquid. That is to say, a mixture of cooling water and the unprocessed and unburned organic naphtha liquid will be circulating through the thermal exchange circuit of the fuel cell system. Therefore, Bloomfield's teachings envision that a mixture of liquid water and unprocessed-unburned organic liquid naphtha might be used as part of the organic cooling fluid of the fuel cell system.*

Bloomfield discloses the fuel cell stack generally comprises a plurality of fuel cells 24 and a thermal management portion 25 (COL 3, lines 23-27/ COL 5, lines 27-31). *Thus, the heat generating component comprises the fuel cell stack itself.*

Bloomfield discloses other heat generating components such as the selective oxidizer 14 and the shift converter 16 as well as the heat exchanger 72 (COL 5, lines 28-40). The cooling fluid, for instance, picks up heat from the foregoing heat generating components (COL 5, lines 28-40). *In this case, the selective oxidizer and the shift converter represent catalytic combustors.*

It is disclosed that on the anode side, a hydrogen containing liquid fluid such as naphtha is used as the reactant material. In addition, fuels such as methane may be used (COL 4, lines 1-15). *It is noted that naphtha and methane are organic fluids.*

Bloomfield discloses a heat transfer process as described above. However, Bloomfield does not expressly disclose the specific bipolar cooling plate.

Myerhoff disclose a fuel cell design and assembly (TITLE) comprising a bipolar cooling plate, fuel cell design and method of assembly of the fuel cell (ABSTRACT/ COL 1, lines 9-15/ COL 2, lines 22-25).

In light of these disclosures, it would have been obvious to one skilled in the art at the time the invention was made to use the specific bipolar cooling plate of Myerhoff in the process of Bloomfield as Myerhoff discloses that such bipolar cooling plate and its associated fuel design and assembly enables pretesting of a short stack of fuel cell prior to assembly into a tall multicell fuel cell stack. Accordingly, this novel design makes dismantling of the tall multi-cell fuel cell stack easier and safer.

12. Claim 2 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bloomfield 3982962 as applied to claims 1 above, and further in view of Ennis et al 5938975.

Bloomfield discloses a process for operating a fuel cell system according to the afore-described aspects. Nonetheless, Bloomfield does not expressly disclose using the shaft work to drive a pump.

Ennis et al disclose a method and apparatus for energy fuel conversion systems (TITLE) including fuel cells (COL 4, lines 18-22/ COL 5, lines 40-45/ COL 23, lines 49-65). It is also

disclosed that shaft work of the turbine can be for electrical generation only, or can also include work to operate one or more compressors or pumps (COL 6, lines 4-6).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to employ the shaft work to drive a pump of Ennis et al in the process of Bloomfield because Ennis et al teach that shaft work of the turbine can be used to operate pumps. Hence, this provides an efficient manner of utilizing and optimizing energy consumption in methods and apparatus of total energy fuel conversion.

13. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bloomfield 3982962 as applied to claim 1, and further in view of Keller 3968999.

Bloomfield is applied, argued and incorporated herein for the reasons above. However, Bloomfield does not expressly teach the specific organic cooling fluid as recited in claim 10.

Keller discloses that a halo-substituted hydrocarbon like the Freons such as dichlorotetrafluoroethane is a suitable refrigerant for the standard heat exchange apparatus employed in refrigeration plants so as to cool methanol (COL 6, lines 52-68). Keller further discloses that methanol is a prime candidate for generating electricity in fuel cells, being one of the few known fuels suited to fuel cell power generation (COL 10, lines 8-20).

In view of the above, it would have been obvious to one skilled in the art at the time the invention was made to use the specific organic cooling fluid of Keller in the fuel cell system of Bloomfield as Keller discloses that a halo-substituted hydrocarbon like the Freons such as dichlorotetrafluoroethane is a suitable refrigerant for the standard heat exchange apparatus because it has very little energy requirements as well as because this refrigerant is conventionally

available and its selection and use in conventional refrigeration apparatus is tailored to the temperatures needed in the heat exchanger. In addition, since Keller discloses that dichlorotetrafluoroethane is a suitable refrigerant for the standard heat exchange apparatus employed in refrigeration plants so as to cool methanol, and given that Keller has also disclosed that methanol is a prime candidate for generating electricity in fuel cells, it is further contended that those of ordinary skill in the art would have sufficient motivation to use Keller's refrigerant in methanol fuel cells or fuel cells employing methanol. That is, in view of Keller's teaching, the technology for cooling methanol is applicable and employable in fuel cells operated by using methanol as fuels. *Moreover, this is also consistent with the fact that Bloomfield clearly discloses that the working fluid is not necessarily water and the working fluid may be any fluid having suitable vapor pressure and temperature characteristics. Thus, Keller and Bloomfield are pertinent to each other as they both address the same problem of providing suitable cooling fluids or refrigerant for fuel cells.*

Allowable Subject Matter

14. The following is a statement of reasons for the indication of allowable subject matter: refer to the Advisory Action of 09/13/04 and the amendment dated 08/30/04.

15. Claims 7-8 and 11 are allowed.

Response to Arguments

16. Applicant's arguments with respect to claims 1-2 and 10 have been considered but are moot in view of the new ground(s) of rejection.

17. Additionally, upon a thorough review of the specification as filed, the examiner has determined that the 35 USC 112 rejections presented hereinbefore are necessary because the newly added limitations significantly modify the scope of the claimed invention but they are unsupported. Accordingly, applicant is kindly requested to explain where in the original specification those limitations can be found so as to provide adequate written description and pertinent enablement thereof.

The examiner is also repeating hereinbelow the response to arguments/issues already presented in the Examiner's Answer:

18. The main contention of appellant's argument is grounded on the allegation that the prior art of record fail to disclose using an organic cooling fluid at all or flowing the organic based liquid cooling fluid through fuel cell components. However, this assertion is respectfully disagreed with because as noted in the rejection above the prior art (Bloomfield) clearly specifies that water recovered from the anode effluent gas streams in the condensers 54 or 80 is combined at mixing point 108 with the cooling fluid of the fuel cell power plant (COL 5, lines 50-62). Bloomfield also teaches that the anode gas stream effluent contains enough unburned gas (←emphasis added) such that there is no need for the burner 20 to have a separated fuel supply (COL 4, lines 63-67). Bloomfield further discloses that on the anode side, a hydrogen containing liquid fluid such as naphtha is used as the reactant material. In addition, fuels such as methane may be used (COL 4, lines 1-15). It is noted that naphtha and methane are organic fluids. It is further disclosed that although the hydrogen containing liquid fuel such as naphtha is processed in the steam reforming reactor 18 (COL 4, lines 1-5), partial processed fuel leaves the reactor 18 (emphasis added), entering the shift converter 16 to only reduce the carbon monoxide of the gas

stream (COL 4, lines 16-27) from the shift converter 16 the gases pass into the selective oxidizer 14 to further reduce the carbon monoxide content of gases (COL 4, lines 28-36). Bloomfield also teaches that a shift converter or selective oxidizer is not required (emphasis added), wherein the requirement of the fuel conditioning apparatus are dependent in part upon the type of unprocessed fuel being used (emphasis added) and upon the particular design of the cells (COL 4, lines 40-50).

19. (*emphasis added*→) Therefore, having shown that: a) only partially processed fuel such as naphtha leaves the steam reforming reactor 18; b) no further fuel conditioning such as the shift converter and the selective oxidizer is required; c) unburned gas remains in the anode gas stream effluent, and d) the liquid water or a mixture of liquid water and steam leaving the condenser 102 via a conduit 106 is combined at 108 (*emphasis added*) with stream recovered from the anode effluent gas streams, it is positively contended that some of the unprocessed and unburned naphtha reactant being fed into the reforming unit and thereafter into the fuel cell will remain in the anode effluent gas stream and thus will be mixed at the mixing point 108 with the cooling water recirculating through the fuel cell cooling system. Accordingly, cooling fluid would includes both water and residual organic liquid naphtha as cooling liquid. That is to say, a mixture of cooling water and the unprocessed and unburned organic naphtha liquid will be circulating through the thermal exchange circuit of the fuel cell system. Therefore, those of ordinary skill, in view of Bloomfield's teachings, will envision that a mixture of liquid water and unprocessed-unburned organic liquid naphtha will be re-circulating through the cooling loop of Bloomfield's fuel cell system. Therefore, such mixture of liquid water and unprocessed-

unburned organic liquid naphtha becomes the organic based liquid working fluid of the cooling fluid in the fuel cell system.

20. Moreover, given that the term "organic based liquid working fluid" is not defined by the claim, and the specification does not provide a standard for ascertaining the requisite degree, the examiner further contends that such cooling water mixed at the mixing point 108 with the anode effluent gas stream containing residual organic liquid naphtha (as explained by the examiner above) satisfies the claimed requirement of being the organic based liquid working fluid.

21. Additionally, Bloomfield clearly discloses alternate embodiments wherein the working fluid is not necessarily water (Bloomfield, COL 6, lines 10-17). In addition, the prior art further discloses that the working fluid which is pumped around the system may be, for example, trichlorofluroethane, commonly known as Refrigerant 113, but any fluid having suitable vapor pressure and temperature characteristics may be employed (Bloomfield COL 6, lines 37-45). Thus, it is noted that the prior art has clearly envisioned and envisaged the use of an organic cooling medium in fuel cell applications regardless of whether or not the Rankine cycle loop does include the fuel cell. In that, it is further noted that a reference is good for what its teachings disclose or, at least, what the teachings, in general, of the reference would have suggested to those of ordinary skill in the art. The examiner does not understand applicants' position of arbitrarily arguing that because the Bloomfield reference teaches a separate Rankine loop, in fact, the reference is not teaching or suggesting using the chlorofluorocarbon organic cooling medium in fuel cell applications when it is remarkably outstanding that Bloomfield is addressing and solving the fuel cell heat exchanging mechanism, cycle or loop.

Therefore, one way or another and either directly or indirectly, the Bloomfield reference employs the organic cooling medium in the heat transfer cycle/loop of his fuel cell.

22. In response to applicant's argument that there is no suggestion to combine the references (i.e. there is no suggestion to use the turbine of Ennis et al in a rankine cycle loop that includes a fuel cell), the examiner recognizes that obviousness can only be established by combining or modifying the teachings of the prior art to produce the claimed invention where there is some teaching, suggestion, or motivation to do so found either in the references themselves or in the knowledge generally available to one of ordinary skill in the art. See *In re Fine*, 837 F.2d 1071, 5 USPQ2d 1596 (Fed. Cir. 1988)and *In re Jones*, 958 F.2d 347, 21 USPQ2d 1941 (Fed. Cir. 1992). In this particular case, Ennis et al disclose a method and apparatus for energy fuel conversion systems (TITLE) including fuel cells (Ennis et al: COL 4, lines 18-22/ COL 5, lines 40-45/ COL 23, lines 49-65) wherein the shaft work of the turbine can be for electrical generation only, or can also include work to operate one or more compressors or pumps (Ennis et al: COL 6, lines 4-6). Thus, Ennis et al directly teach that the shaft work of the turbine can be used to operate pumps; and therefore, this provides an efficient manner of utilizing and optimizing energy consumption in methods and apparatus of total energy fuel conversion. Accordingly, both references (i.e. Ennis et al and Bloomfield) are reasonably relevant to one another as they both address the same problem of managing efficient energy generation and consumption for energy conversions system including fuel cells.

Furthermore, the test for obviousness is not whether the features of a secondary reference may be bodily incorporated into the structure of the primary reference; nor is it that the claimed invention must be expressly suggested in any one or all of the references. Rather, the test is what

the combined teachings of the references would have suggested to those of ordinary skill in the art. See *In re Keller*, 642 F.2d 413, 208 USPQ 871 (CCPA 1981).

23. In response to applicant's argument that Keller is nonanalogous art, it has been held that a prior art reference must either be in the field of applicant's endeavor or, if not, then be reasonably pertinent to the particular problem with which the applicant was concerned, in order to be relied upon as a basis for rejection of the claimed invention. See *In re Oetiker*, 977 F.2d 1443, 24 USPQ2d 1443 (Fed. Cir. 1992). In this case, Keller is found to be pertinent to the particular problem with which the applicant is concerned simply because Keller teaches the use of the claimed organic based liquid cooling fluid as a suitable refrigerant for the standard heat exchange apparatuses. Thus, one of ordinary skill in the art will find obvious to look at and use Keller's teaching because of the functional and working similarities between the heat exchanging cooling circle of Keller which uses the specific organic based liquid cooling fluid and applicant's cooling circulation loop.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Raymond Alejandro whose telephone number is (571) 272-1282. The examiner can normally be reached on Monday-Thursday (8:00 am - 6:30 pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Patrick J. Ryan can be reached on (571) 272-1292. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Raymond Alejandro
Primary Examiner
Art Unit 1745

RAYMOND ALEJANDRO
PRIMARY EXAMINER